

## SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102 - F21-R-46

**Name:** Center Lake

**County:** Custer

**Legal description:** Sec.8 and 9, T 3S, R 6E

**Location from nearest town:** 8 miles east and 3 miles north of Custer (Custer State Park)

**Dates of present survey:** May 23-24, 2013

**Date last surveyed:** July 5-6, 2006

**Most recent lake management plan:** F-21-R-40 **Date:** 2008

**Management classification:** Coldwater Permanent

**Contour mapped:** Yes **Date:** 1987

Primary Management Species

1. Rainbow Trout
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Secondary species:

1. White Sucker
2. Creek Chub
3. Brook Trout
4. Tiger Trout

### PHYSICAL CHARACTERISTICS

**Surface Area:** 26.5 ac. (10.7 ha.) **Watershed:** 4,992 ac. (2,021.8 ha.)

**Maximum depth:** 40 ft. (12.2 m) **Mean depth:** 17 ft. (5.2 m)

**Lake elevation at survey:** (from known benchmark): full

### Ownership of lake and adjacent lakeshore property:

Center Lake lies within the boundaries of Custer State Park. The Parks Division of the South Dakota Game, Fish, and Parks (SDGFP) owns and maintains the lake and adjacent shoreline.

### Fishing Access

Center Lake receives a high amount of fishing pressure from area residents and nonresidents in the summer because of its location in Custer State Park. Angling access to Center Lake requires a State Park annual sticker or seven day fee. The lake can be accessed through the campground at Center Lake. A walking trail runs along most of the shoreline around the lake. A boat ramp with loading dock is on the west side of the lake.

### Watershed condition and land use

The watershed above Center Lake is primarily public timberland administered by SDGFP. A small portion of the upper end of the watershed lies outside Custer State Park boundaries and is administered by the U. S. Forest Service. Private cabins, a campground, and an amphitheater are located immediately above the lake. A swimming beach is located on the southwest shoreline. Grace Coolidge Creek, a tributary of Battle Creek, is the main water source for Center Lake. A walk-in fishery is located downstream on Grace Coolidge Creek and its associated lowhead dams.

## **Observation of Water Quality and Aquatic Vegetation**

Emergent vegetation (cattails and bulrush) exists in the inlet region. Submergent forms are evident in littoral areas along much of the shoreline excluding the spillway area.

Moderate pollution and sedimentation likely occurs due to the campground development and adjacent roads. Some silt was removed in 1973 after drawing down the reservoir level prior to nongame fish eradication. The construction of a hard surfaced road and camping pads in 1973-1974 appears to have lessened the impacts of erosion.

## **Observations on conditions of structures (i.e. spillway, boat ramps and docks, roads, etc)**

Center Lake was constructed in the 1930s by the Civilian Conservation Corps. The dam and spillway appear to be structurally sound. The control structure was repaired in 1965 after a draw down prior to fish eradication. One improved boat ramp and dock exist on the north shore.

## **MANAGEMENT OBJECTIVES**

- Objective 1.** Maintain Center Lake as a as a put and take Rainbow Trout fishery through regular stockings of catchable (11 in) fish, where catch rates exceed 0.5 per hour.
- Objective 2.** Determine angler attitudes and angling success every 5 to 10 years by conducting a creel survey to determine angler satisfaction, preference and catch and harvest rates.
- Objective 3.** Keep the local Conservation Officer, Custer State Park and the public informed of fisheries management activities and solicit their input on fisheries management.

## **CHEMICAL DATA**

Center Lake (Figure 1) was sampled on May 23<sup>rd</sup> to measure water parameters (Table 1). Field measurements included depth, temperature, dissolved oxygen, pH, and conductivity. A thermocline was present at about 2 to 6 m. Sufficient oxygen levels with cold enough temperatures for trout were present through the whole water column.

Table 1. Water quality data from Center Lake, South Dakota collected on May 23, 2013.

| Depth | Temp (°C) | D.O. (mg/L) | pH   | Conductivity |
|-------|-----------|-------------|------|--------------|
| 0.5   | 14.32     | 9.54        | 8.49 | 0.126        |
| 1.0   | 14.26     | 9.45        | 8.46 | 0.127        |
| 2.0   | 14.15     | 9.44        | 8.46 | 0.126        |
| 3.0   | 13.41     | 9.28        | 8.30 | 0.127        |
| 4.0   | 12.66     | 9.17        | 8.11 | 0.125        |
| 4.5   | 11.76     | 9.84        | 8.14 | 0.125        |
| 5.0   | 8.45      | 11.15       | 8.29 | 0.123        |
| 5.5   | 7.23      | 10.98       | 8.15 | 0.124        |
| 6.0   | 6.57      | 10.62       | 8.03 | 0.124        |
| 6.5   | 6.34      | 10.45       | 7.95 | 0.124        |
| 7.0   | 6.05      | 9.68        | 7.76 | 0.124        |
| 7.5   | 5.80      | 9.00        | 7.65 | 0.121        |
| 8.0   | 5.62      | 8.19        | 7.54 | 0.121        |
| 8.5   | 5.53      | 7.15        | 7.42 | 0.122        |
| 9.0   | 5.37      | 6.78        | 7.37 | 0.121        |
| 9.5   | 5.30      | 6.45        | 7.36 | 0.121        |
| 10.0  | 5.23      | 5.98        | 7.31 | 0.121        |
| 10.5  | 5.20      | 5.23        | 7.24 | 0.122        |

## BIOLOGICAL DATA

### Sampling Effort and Catch

Trap netting was conducted on May 23-24, 2013. Sampling consisted of four trap net nights (Figure 1). Three trap nets were modified fyke-nets with 1.3 X 1.5 m frame, 19.1 mm (0.75 in) mesh and a 1.2 X 23 m (3.9 X 75.5 ft) lead. The fourth trap net had 6.4 mm (0.25 in) mesh and a 15.24 m (50 ft) lead.

Five species of fish were collected during the survey (Table 2). In past surveys, as well as the current survey, Rainbow Trout, White Suckers and Creek Chubs have been present in the lake. Additionally, Brook Trout and Fathead Minnows were collected in 2013, which were not captured during the survey in 2006, but were during the 1994 survey.

Table 2. Total catch of one 6.4 mm (0.25 in) mesh trap net set in Center Lake on May 23, 2013. Parameters are reported with confidence intervals.

| Species        | N/CPUE | CPUE-S (80%) | PSD | Wr-S (90%) |
|----------------|--------|--------------|-----|------------|
| Brook Trout    | 1      | 1            | 0   | 88.1       |
| Creek Chub     | 19     | --           | -   | -          |
| Fathead Minnow | 20     | --           | -   | -          |
| Rainbow Trout  | 2      | 0            | 0   | 96.7*      |
| White Sucker   | 7      | 1            | 100 | 80.0 (4.4) |

\*Wr for substock fish

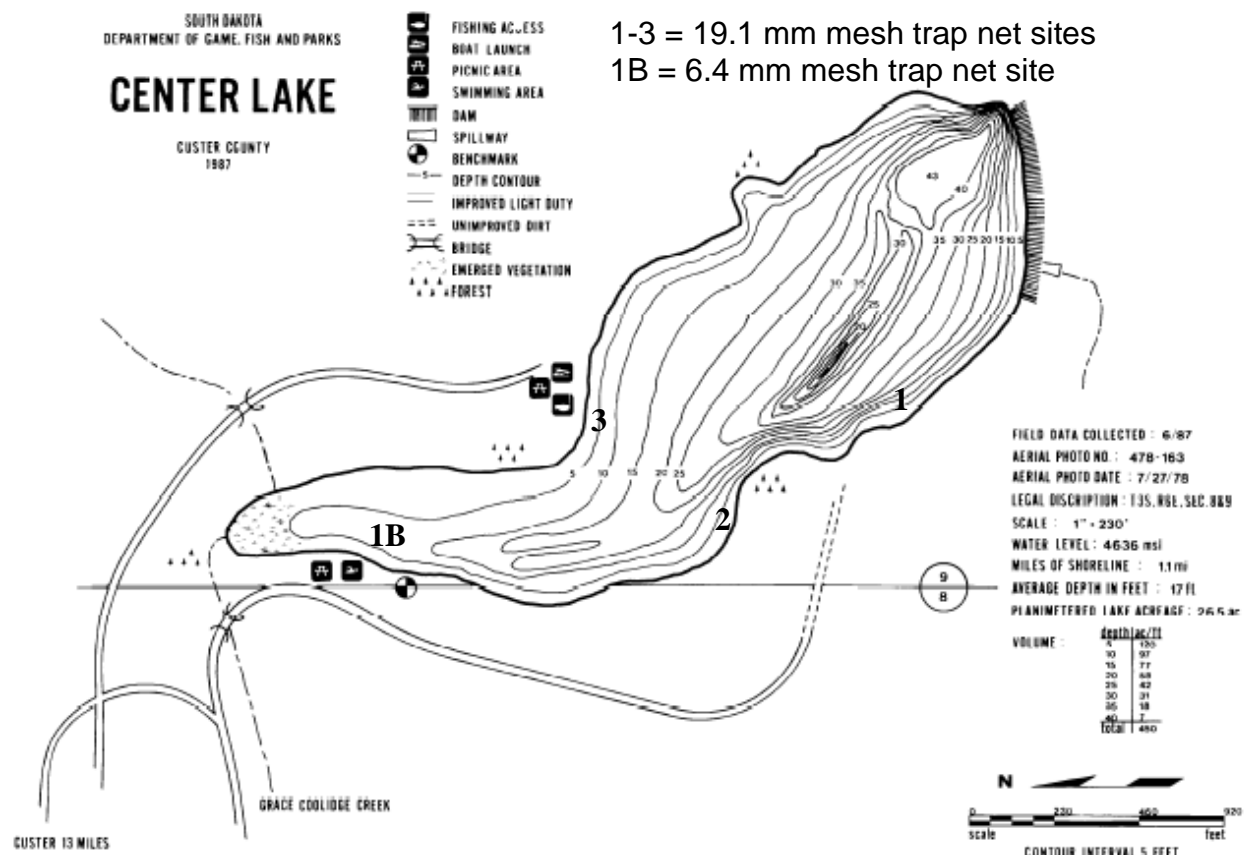


Figure 1. Lake map and trap net sampling locations on Center Lake, South Dakota in 2013.

Table 3. Total catch of three 19.1 mm (0.75 in) mesh trap nets set in Center Lake on May 23, 2013. Parameters are reported with confidence intervals.

| Species       | N  | CPUE<br>(80%) | CPUE-S<br>(80%) | PSD<br>(90%) | PSD-P<br>(90%) | Wr-S<br>(90%) |
|---------------|----|---------------|-----------------|--------------|----------------|---------------|
| Brook Trout   | 2  | 0.7 (1.3)     | 0               | 0            | 0              | 87.4*         |
| Creek Chub    | 47 | 15.7 (12.9)   | -               | -            | -              | -             |
| Rainbow Trout | 34 | 11.3 (9.3)    | 3.3 (1.7)       | 0            | 0              | 102.2 (6.8)   |
| White Sucker  | 42 | 14.0 (10.4)   | 14.0 (10.4)     | 86 (9)       | 33 (12)        | 85.1 (0.4)    |

\*Wr for sub-stock fish

### Rainbow Trout

Center Lake is managed as a put-and-take fishery and receives over 7,400 catchable (280 mm; 11 in) and 375 large (380 mm; 15 in) Rainbow Trout stocked annually. Prior to the survey 2,550 had been stocked this year. The survey on May 23-24 yielded 34 fish in the 19.1 mm mesh traps nets and two in the 6.1 mm mesh trap net. They exhibited good condition with a *Wr* of 102.2 for stock length fish (250 mm) and 104.9 for sub-stock length fish. PSD (quality= 400 mm) was zero with most fish between 200 and 280 mm (Figure 2), which is a bit small for catchable trout.

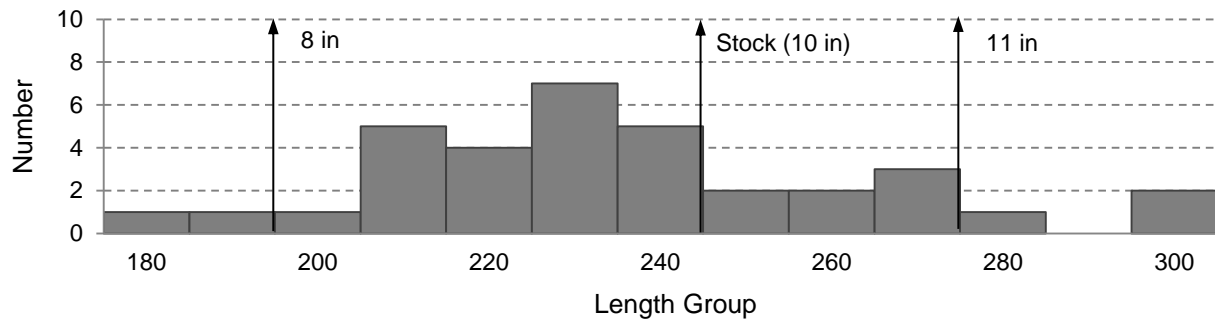


Figure 2. Length frequency histogram for Rainbow Trout captured during the trap net survey of Center Lake, South Dakota in May 2013.

### Tiger Trout

Fingerling and large fingerling Tiger Trout (N=9,816) were stocked into Center Lake in 2009 to provide a unique fishery for anglers. None were sampled during the 2013 survey and exploratory boat electrofishing was done in 2011 and 2012 with one Tiger Trout captured. Angler reports still come in on occasion of people catching Tiger Trout in Center Lake. In 2010 anglers were catching Tiger Trout in Grace Coolidge Creek above Center Lake and a back-pack electrofishing survey collected them in the creek that fall. Also, in April 2012 a new state record Tiger Trout weighing 1lb 2 oz was caught from Center Lake. At this time, there are no plans to stock more Tiger Trout into Center Lake, since finding a disease free source has proven difficult.

## **RECOMMENDATIONS**

1. Continue with current catchable Rainbow Trout stockings.
2. Conduct a lake survey every five to seven years to update information on fish populations and evaluate management strategies.
3. Search for a disease free source of Tiger Trout eggs to be hatched and raised to catchable sizes in state hatcheries to continue providing this unique fishery.
4. If a disease free source of Tiger Trout eggs cannot be found, consider Cutthroat Trout, Brown Trout or some other salmonid to utilize the Creek Chub and White Sucker populations and provide a unique fishery for anglers.

## APPENDIX

### Appendix I. Stocking history for Center Lake, South Dakota 2004-2013

| Year | Species (Strain)              | Size           | # of Stockings | Number of fish |
|------|-------------------------------|----------------|----------------|----------------|
| 2004 | Rainbow Trout                 | Catchable 15"  | 7              | 460            |
|      | Rainbow Trout                 | Catchable      | 5              | 5,500          |
| 2005 | Rainbow Trout                 | Catchable 15"  | 5              | 470            |
|      | Rainbow Trout (Eagle Lake)    | Catchable      | 4              | 4,530          |
|      | Rainbow Trout (Shasta)        | Catchable      | 2              | 2,702          |
| 2006 | Rainbow Trout (Erwin)         | Catchable 15"  | 3              | 168            |
|      | Rainbow Trout (Erwin)         | Catchable      | 1              | 1,100          |
|      | Rainbow Trout (Shasta)        | Catchable      | 5              | 5,500          |
| 2007 | Brown Trout (Soda Lake)       | Catchable      | 2              | 1,476          |
|      | Rainbow Trout (Erwin)         | Catchable 11"  | 4              | 1,599          |
|      | Rainbow Trout (Erwin)         | Catchable 15"  | 3              | 90             |
|      | Rainbow Trout (Shasta)        | Catchable 11"  | 3              | 2,200          |
| 2008 | Rainbow Trout (Erwin)         | Catchable 15"  | 4              | 181            |
|      | Rainbow Trout (Shasta)        | Catchable 11"  | 3              | 2,820          |
|      | Rainbow Trout (Utah)          | Catchable      | 2              | 1,360          |
|      | Tiger Trout (Utah)            | Fingerling     | 1              | 11,117         |
| 2009 | Rainbow Trout (Erwin)         | Catchable      | 1              | 1,100          |
|      | Rainbow Trout (Shasta)        | Catchable 11"  | 10             | 6,680          |
|      | Rainbow Trout (Shasta)        | Catchable 15"  | 2              | 150            |
|      | Rainbow Trout (Utah)          | Catchable 15"  | 4              | 300            |
|      | Tiger Trout (Utah)            | Lrg Fingerling | 1              | 4,876          |
|      | Tiger Trout (Utah)            | Fingerling     | 1              | 4,940          |
| 2010 | Rainbow Trout (Erwin x Arlee) | Catchable      | 1              | 1,100          |
|      | Rainbow Trout (Erwin)         | Catchable 15"  | 6              | 450            |
|      | Rainbow Trout (Shasta)        | Catchable      | 5              | 6,000          |
| 2011 | Rainbow Trout (Erwin x Arlee) | Catchable      | 2              | 955            |
|      | Rainbow Trout (Erwin x Arlee) | Catchable 15"  | 5              | 375            |
|      | Rainbow Trout (Shasta)        | Catchable      | 5              | 5,400          |
| 2012 | Rainbow Trout (Erwin x Arlee) | Catchable      | 2              | 2,000          |
|      | Rainbow Trout (Erwin x Arlee) | Catchable 15"  | 5              | 375            |
|      | Rainbow Trout (Shasta)        | Catchable      | 4              | 4,400          |
| 2013 | Rainbow Trout (Erwin x Arlee) | Catchable      | 1              | 75             |
|      | Rainbow Trout (Erwin x Arlee) | Catchable 15"  | 5              | 375            |
|      | Rainbow Trout (Shasta)        | Catchable      | 6              | 7,400          |